

Idaho Standard Practice for

Sampling Concrete for Chloride Analysis

Idaho IR-128-95



1 Scope

- 1.1 This procedure explains methods to be used in sampling concrete for chloride analysis.
- 1.2 Follow the general guidelines in the Bridge Deck Evaluation and Test Procedure Guideline Manual and AASHTO T 260. Specific and special guidelines are described below.

2 General Sampling Information

- 2.1 Lay out the test area to be sampled for a minimum of one (1) sample location per 1,000 square feet (100 square meters) and a minimum of three (3) sample locations per deck. Samples should be taken at points of probable high concentration, i.e., curb lines and lower side of super-elevated decks. Samples should not be taken at points where delamination or spalling has occurred since corrosion is obvious at these locations. Spalling or delamination can be located by performing a chain drag evaluation of a bridge deck, which can be valuable if the deck is bare or has a single seal coat. A seal coat of plant mix may give inaccurate information from a chain drag evaluation since the asphalt attenuates the sounds.
- 2.2 The best way to identify chloride sample depths and locations is to refer to the bridge plans for descriptions of the rebar location and depth, span size, and number of spans. A pachometer can also be used to locate the rebar depths and locations.

3 Sampling Procedures and Guidelines

- 3.1 For sampling, a rotary hammer is recommended with a 1 inch by 12 inches (25 mm by 300 mm) carbide-tipped bit and various thin wall electrical conduit depth sleeves. Also needed for sampling are a sampling spoon or spatula, 20-dram plastic vials or other sample containers, nylon bristle brushes, paper towels, and 2-Propanol (Isopropyl alcohol). In addition, some means of a "blowout" bulb, a portable air compressor, or other device is needed to clean out the holes after each test depth has been drilled and sampled.

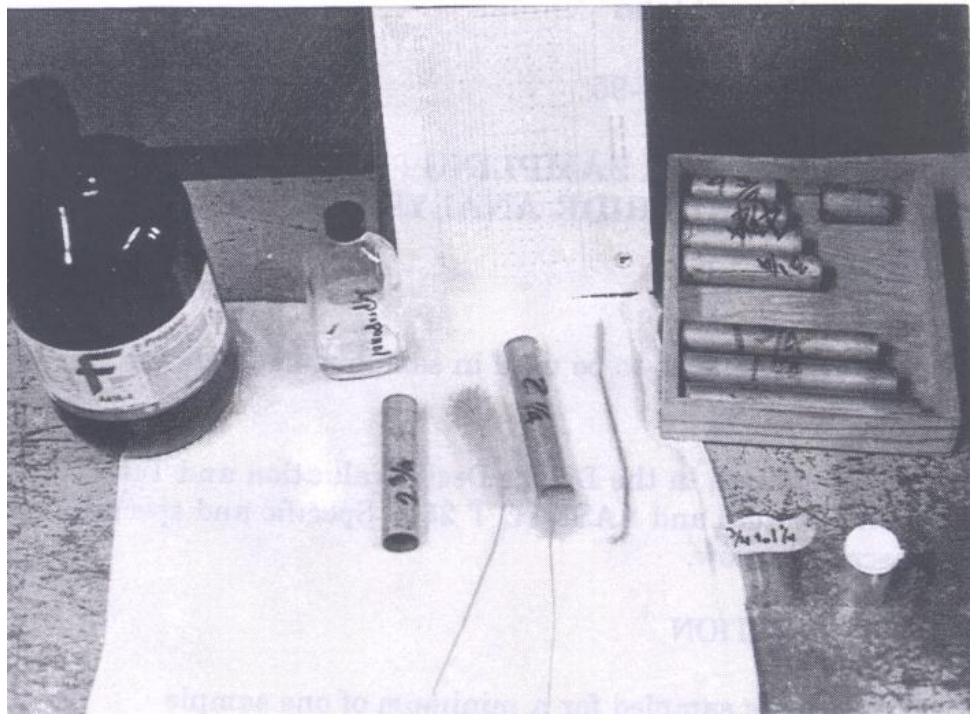
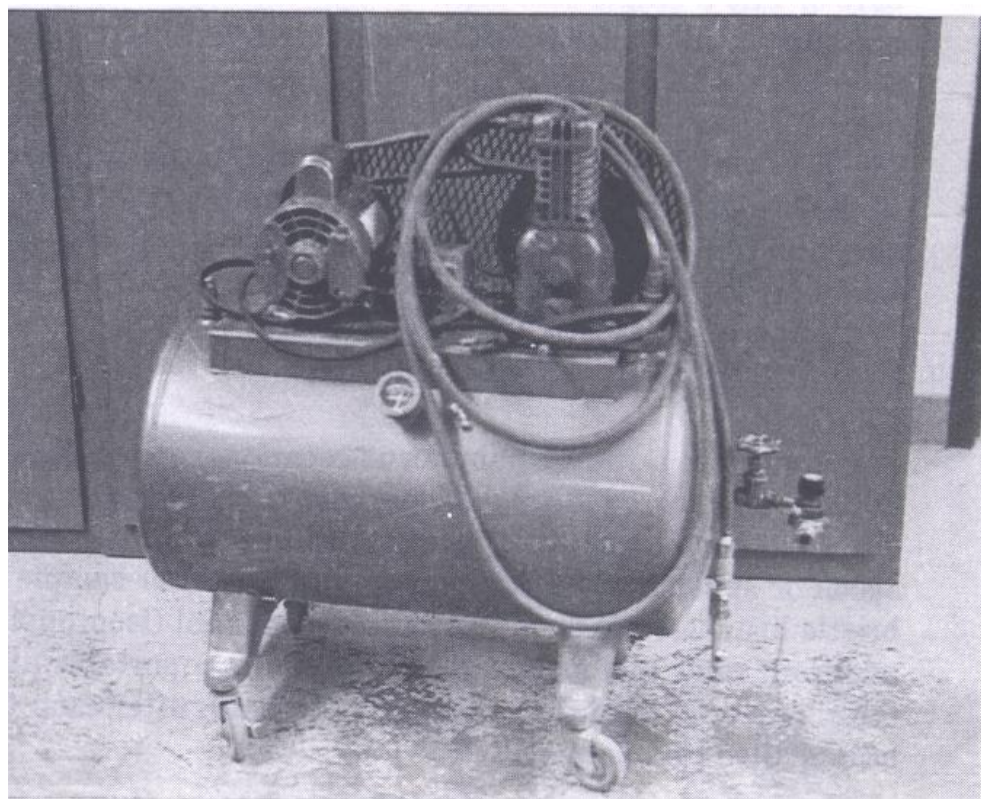


Illustration A

Electrical conduit pipe cut for use as depth sleeves; 2-Propanol and a nylon brush are used to clean between samples.

Illustration B

Portable air compressor for cleaning between samples.

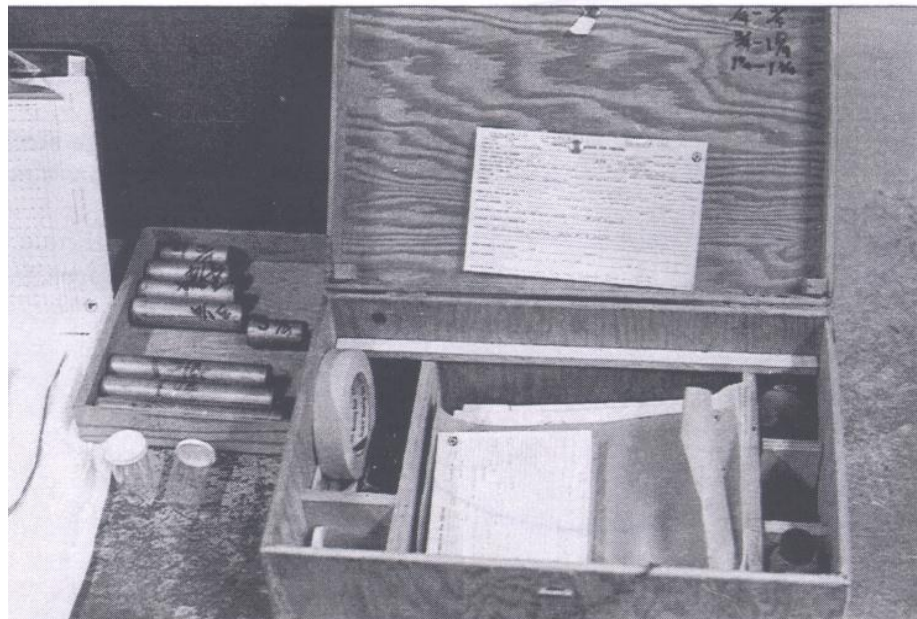


- 3.2 Samples are usually taken at three (3) separate depths predetermined according to the depth of the rebar in the bridge deck. In addition, a sample taken at or just below the rebar can be informative for severe chloride penetration. The samples are taken at approximately even increments of 1/2 inch (15 mm). See Table 1 below.

Table 1 Nominal Drilling Depths in 1/2 inch Increments (15 mm)			
ENGLISH MEASUREMENT		METRIC MEASUREMENT	
From	To	From	To
1/4 inch	3/4 inch	5 mm	20 mm
3/4 inch	1 1/4 inch	20 mm	35 mm
1 1/4 inch	1 3/4 inch	35 mm	50 mm
1 3/4 inch	2 1/4 inch	50 mm	65 mm
2 1/4 inch	2 3/4 inch	65 mm	80 mm
2 3/4 inch	3 1/4 inch	80 mm	95 mm
3 1/4 inch	3 3/4 inch	95 mm	110 mm

Note: Millimeters (mm) are the metric sample depths and are based upon approximations of the English measurements.

Illustration C
Chloride sampling kit.



- 3.3 Using the rotary hammer, scar the surface approximately 1/4 inch (6 mm) deep. This assures that the samples will be taken below the surface dirt and other possible sources of erroneously high salt content. Drill three (3) holes within a 6-inch (150 mm) diameter to obtain enough sample from each sampling depth. See [Illustration E](#) below.

Illustration D

Rotary hammer for sampling concrete for chloride testing.

Hammer with depth sleeve set 2 1/4 inches (65 mm) sample depth.

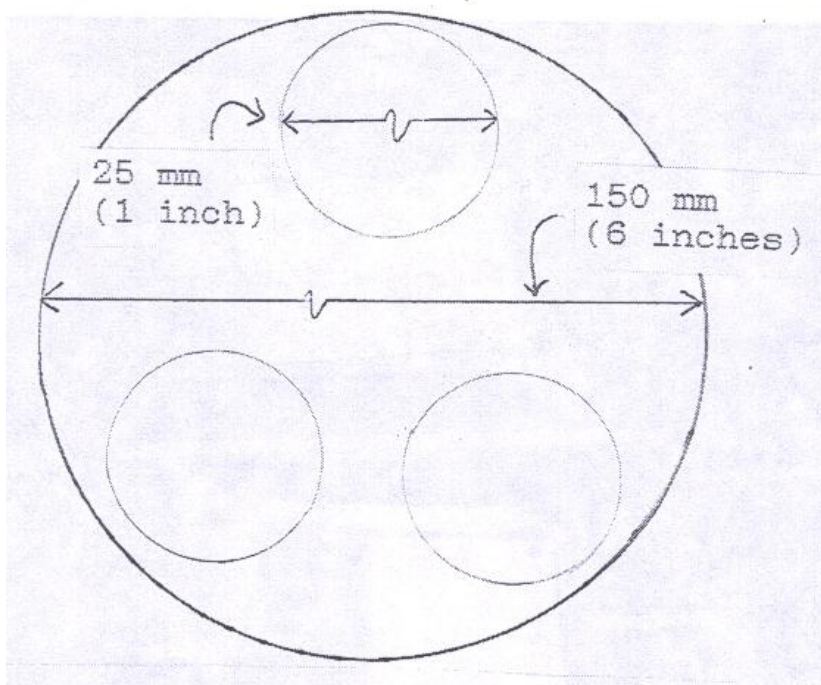
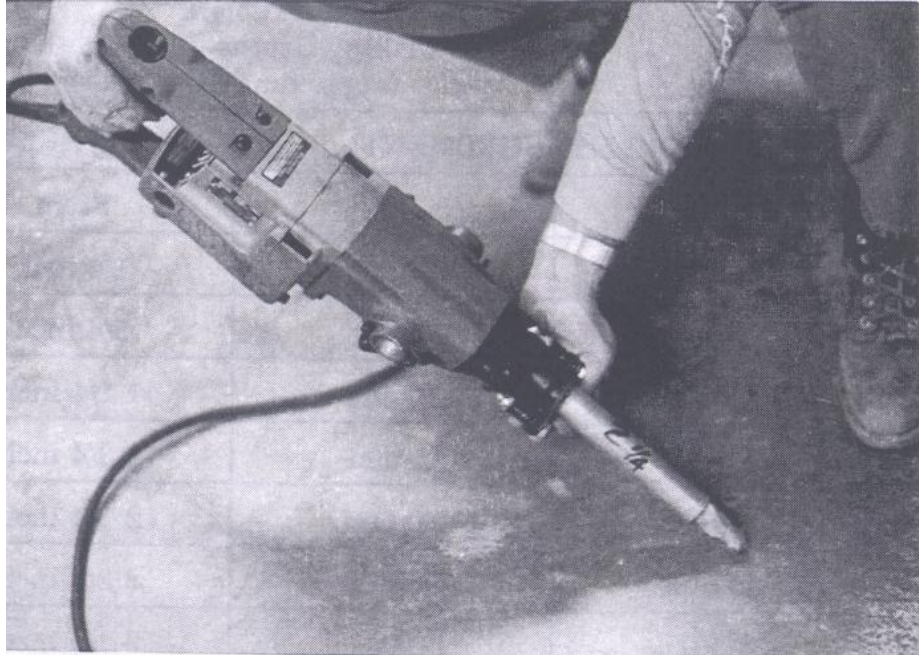


Illustration E

Illustration is not drawn to scale.

Suggested sampling area for one (1) chloride sample location.

Large circle diameter 6 inches (150 mm).

Drill hole diameter 1 inch (25 mm).

- 3.4 Blow out the hole and the surrounding area using an air compressor, blowout bulb, or some other means that is suitable. Do not use alcohol to clean out the sample holes. Clean sampling tools: rotary hammer drill bit, depth sleeve, spoon, etc., using a nylon brush, paper towels, and 2-Propanol (Isopropyl alcohol) between samples to assure no contamination between samples. The rotary hammer drill bit and depth sleeves must be completely dry before proceeding with the next sample.
- 3.5 Place the first depth sleeve on the drill bit and drill in the three (3) established holes with the rotary hammer. See [Illustration F](#) below.

Illustration F

Rotary hammer with depth sleeve in place. Ready to drill sample.

Clean drill bit, depth sleeve, and sampling spoon between sample depths with 2-Propanol.



- 3.6 Drill until the depth sleeve seats itself on the concrete surface. Pull out the drill bit and, using a sampling spoon, carefully gather the pulverized sample out of the three (3) drilled holes. Collect the pulverized sample material carefully and completely. Approximately 15 grams (or a 20-gram vial 3/4 full) is needed for each sample depth. Label the sample container for location and depth. The resulting pulverized concrete represents the first sample depth. See [Illustration G](#) below.
- 3.7 Clean the sampling tools: Drill bit, depth sleeves, spoons, etc., using a nylon brush, paper towels, and 2-Propanol (Isopropyl alcohol) to assure no contamination between samples. Rotary hammer and depth indicators must be completely dry before proceeding with the next sample. Blow out the hole and the surrounding area using an air compressor, blowout bulb, or some other suitable means using air.
- 3.8 Place the next sleeve guide on the rotary hammer for the next sampling depth. Drill and pulverize the concrete until the depth sleeve again seats itself on the concrete. Continue with steps 3.2.3 through 3.2.5 until all desired sample depths have been drilled and sampled.

- 3.9 Identify the sampling locations on the [ITD-848](#) Bridge Deck Survey Map or using a created map drawn to scale. Please include with the samples the completed [ITD-1044](#) forms for the samples, identifying specific holes and depths, and a copy of the Bridge Deck Survey Map or created map with information about the areas of delamination. See [Appendix A](#) for a copy of form [ITD-848](#) Bridge Deck Survey Map.

Illustration G

An example of a pulverized chloride sample.



- 3.10 The test hole may be patched with suitable patching material such as Set-45 or mortar (a combination of cement and clean sand) if appropriate.

Appendix A

[illegible]